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Subject TREEHOUSE
Project CDCCS Structure
Sheet No. 1 of
Authored by JB Date 2/1/19
Checked by JB/BO Date 2/3/19

LOADS:

Live load: 40 PSF
Dead load: STRUCTURAL WOOD

Snow: 25 PSF (Ground Snow)

Wind: 115 mph, Exposure B

CALCULATE Weight (DL):

Roof: (10'-3" × 8'-6") ≈ 87.12
USE 88 SF.

DL Roof = 88 × 10 PSF = 880#
Dormers = ADD 50# EA. = 100
980#
= SAY 1000#

WALLS: 1 × 6.3' × [9.3' + 8.3' + 9.3' + 8.3'] × 10psf
= 2217#

Floor: 9.3' × 8.3' × 10psf = 772#
3988.9#

TOTAL WT = SAY 4000#
(This is Conservative)

GRAVITY LOAD TO EA. Leg Support = 1000#

WIND: ≈ Pressure = $\boxed{21\text{ PSF}}$
BASED ON 115 mph

~~× 1.2~~
~~DL = 1200#~~

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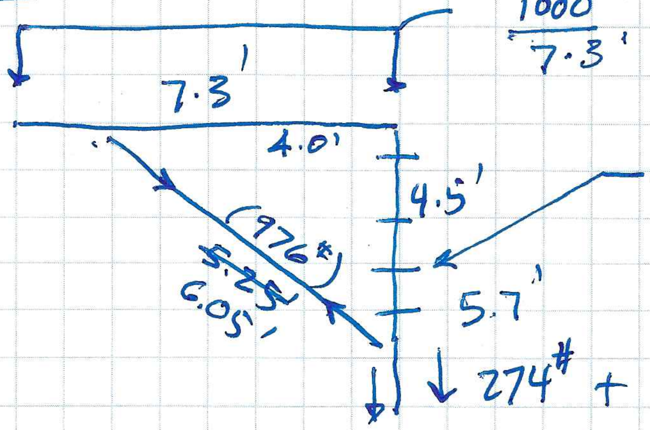
Subject TREEHOUSE
Project CALCS - STRUCTURE
Sheet No. 2 of
Authored by JB Date 2/1/19
Checked by BO Date 2/3/19

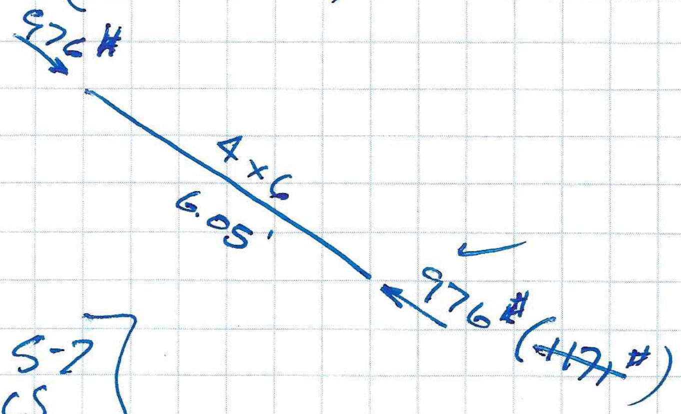
LEG SUPPORT :



$\frac{1000^{\#}}{7.3'}$ = 137 plf x 1.2 = 165 plf

↓ 274# + (1000#) Total Shear

DIAG: 4x6 (3.5 x 5.5) = 19.25 in²



[SEE S-7 CALCS]

CHECK LAG BOLTS:

1/2" φ x 12"

SHEAR Cap. = 624#

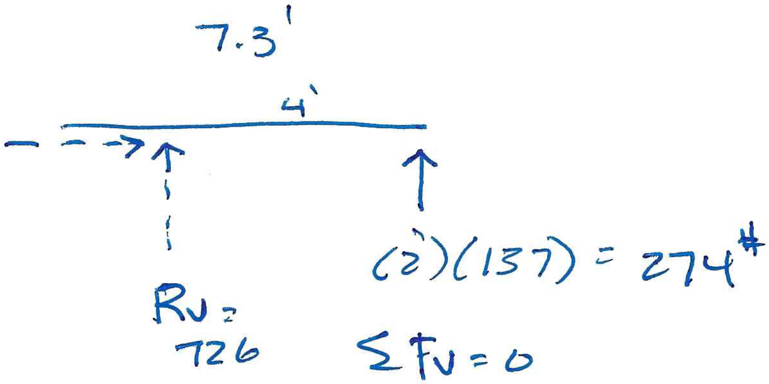
(4) x 624# = $\frac{2496}{\sqrt{1,000}}$ ~~1200~~ = ~~2.5~~ ~~2.1~~ SAFETY FACTOR (Shear)

ok 2.5

> 1.5 OK

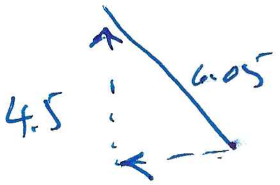
OK

Supplemental
CALCS;



$\Sigma F_V = 0$

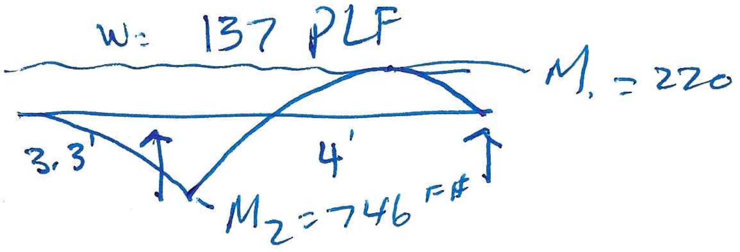
$R_{V_L} = 1000 - 274 = 726^{\#}$



$$\frac{4.5}{726} = \frac{6.05}{x} \therefore x = \frac{(6.05)(726)}{4.5}$$

$$x = 976^{\#}$$

Horizontal Arm:



$$M_1 = \frac{w}{8l^2}(l+a)^2(l-a)^2 = \frac{137}{8(4)}(4+3.3)^2(4-3.3)^2 = 220^{F\text{-}\#}$$

$$M_2 = \frac{wa^2}{2} = \frac{137(3.3)^2}{2} = 746^{F\text{-}\#}$$

Beam

S-2

$M = 746^{ft\text{-}\#}$

$S = (4 \times 6) = 17.646 \, in^3$

$I = 48.52 \, in^4$

$A = 19.25 \, in^2$

Use Allow. Stress = 975 (F_b) Timbers

$$F_b = M/S = \frac{746(12)}{17.646} = 507.28 \, psi < 975 \text{ ok}$$

Simple Sawn Col:

$$L_e = 0.8L = 0.8 \times 6.05' = 4.84'$$

$$\frac{L_e}{d} = \frac{4.84(12)}{3.5} = 16.5 < 50 \text{ ok}$$

$$F_{ce} = \frac{0.3E}{(L_e/d)^2} = \frac{0.3(1{,}300{,}000)}{(16.5)^2} = 1432 \, \#/in^2$$

$$\frac{F_{ce}}{F_c} = \frac{1432}{1121} = 1.27$$

$$F_c = 975 \times 1.15 = 1121 \, \#/in^2$$

$$F_c' = 1121\left[\overset{1.42}{\frac{1+1.27}{2 \times .8}} - \overset{.65}{\sqrt{\left(\frac{1+1.27}{2 \times .8}\right)^2 - \frac{1.27}{.8}}}\right]$$

$$= 857 \, \#/in^2$$

$$P_{Allow} = 857 \times 19.25 = 16{,}510^{\#} << 976^{\#}$$

ok

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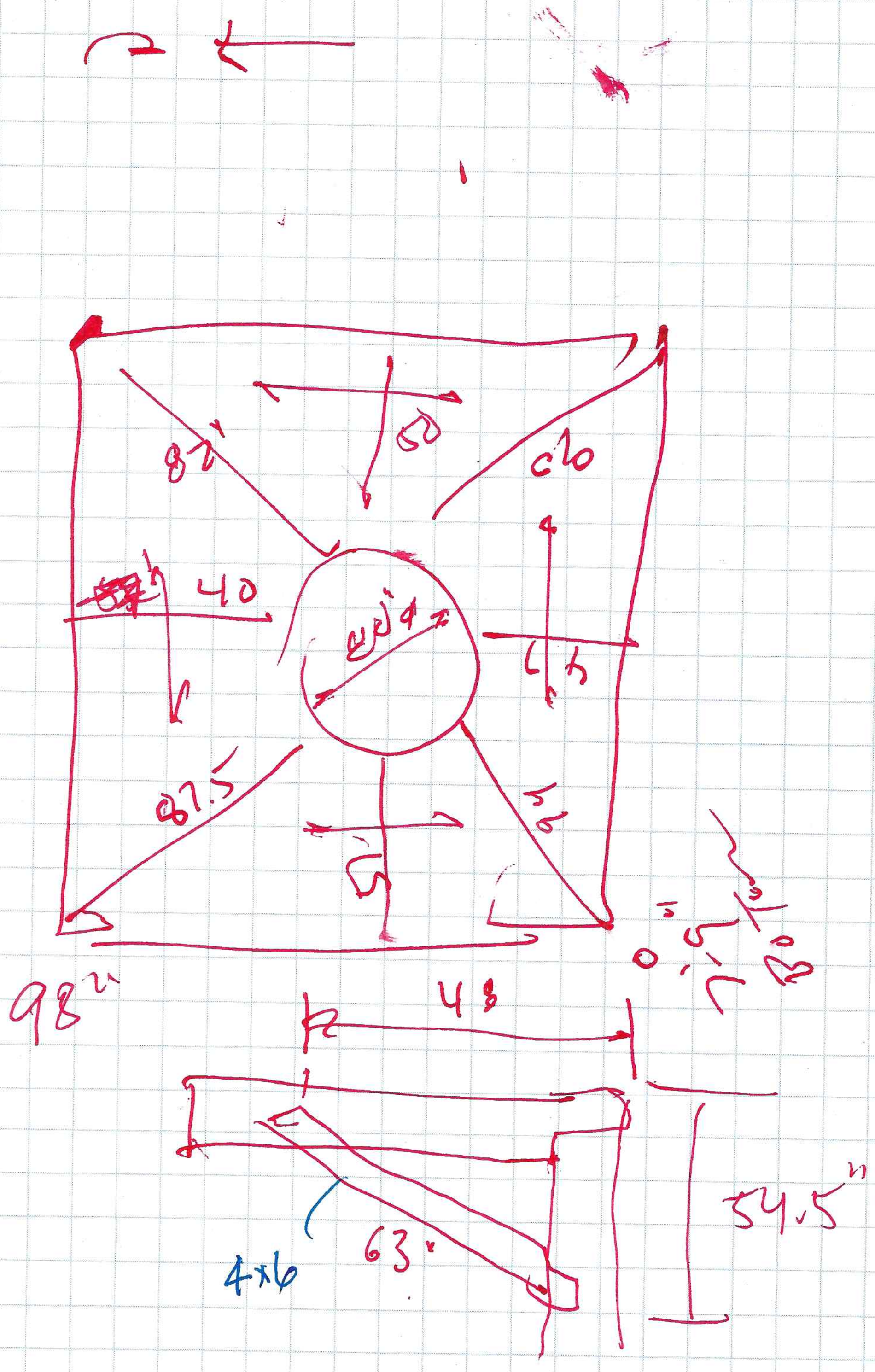
LAYOUT



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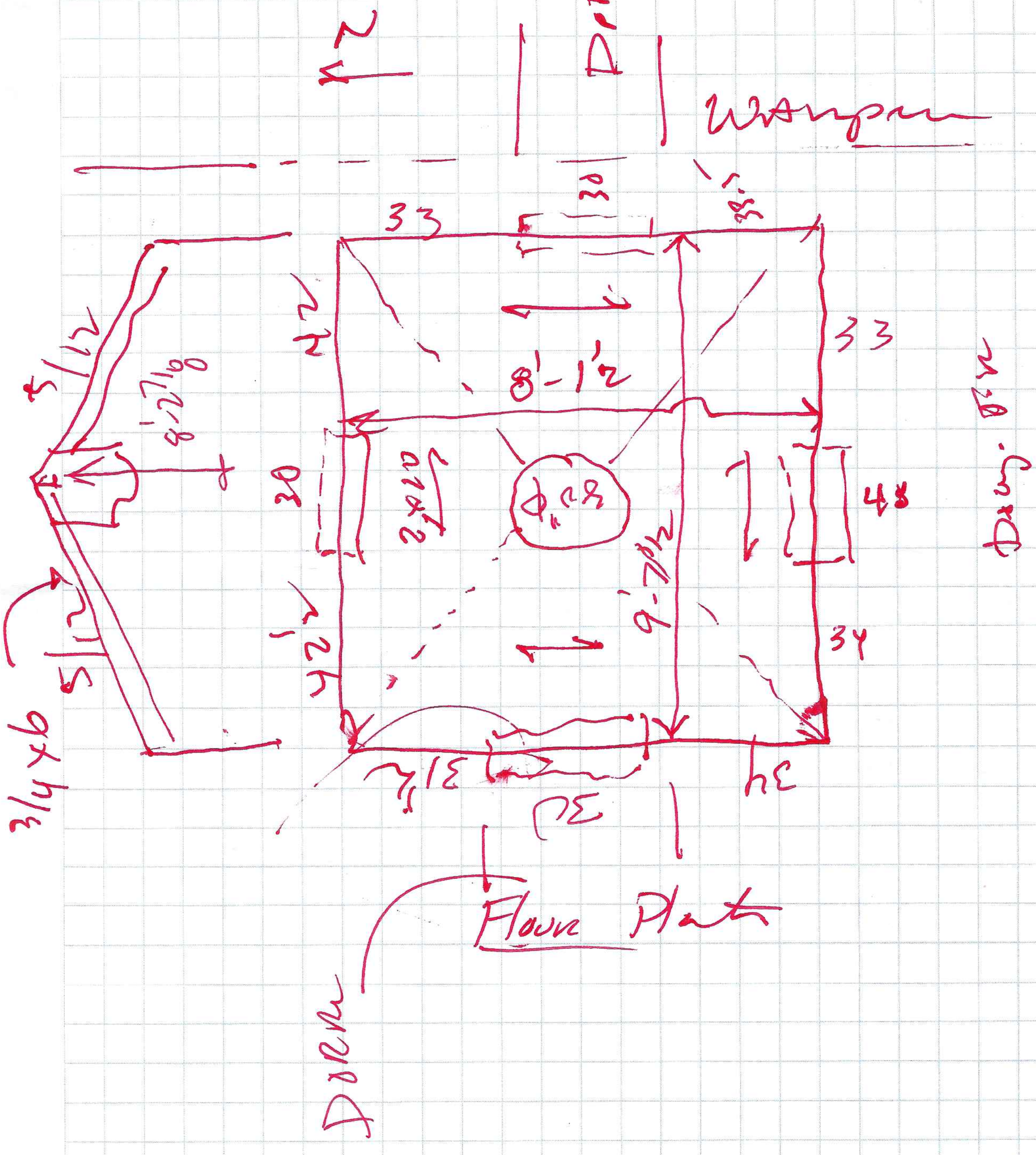
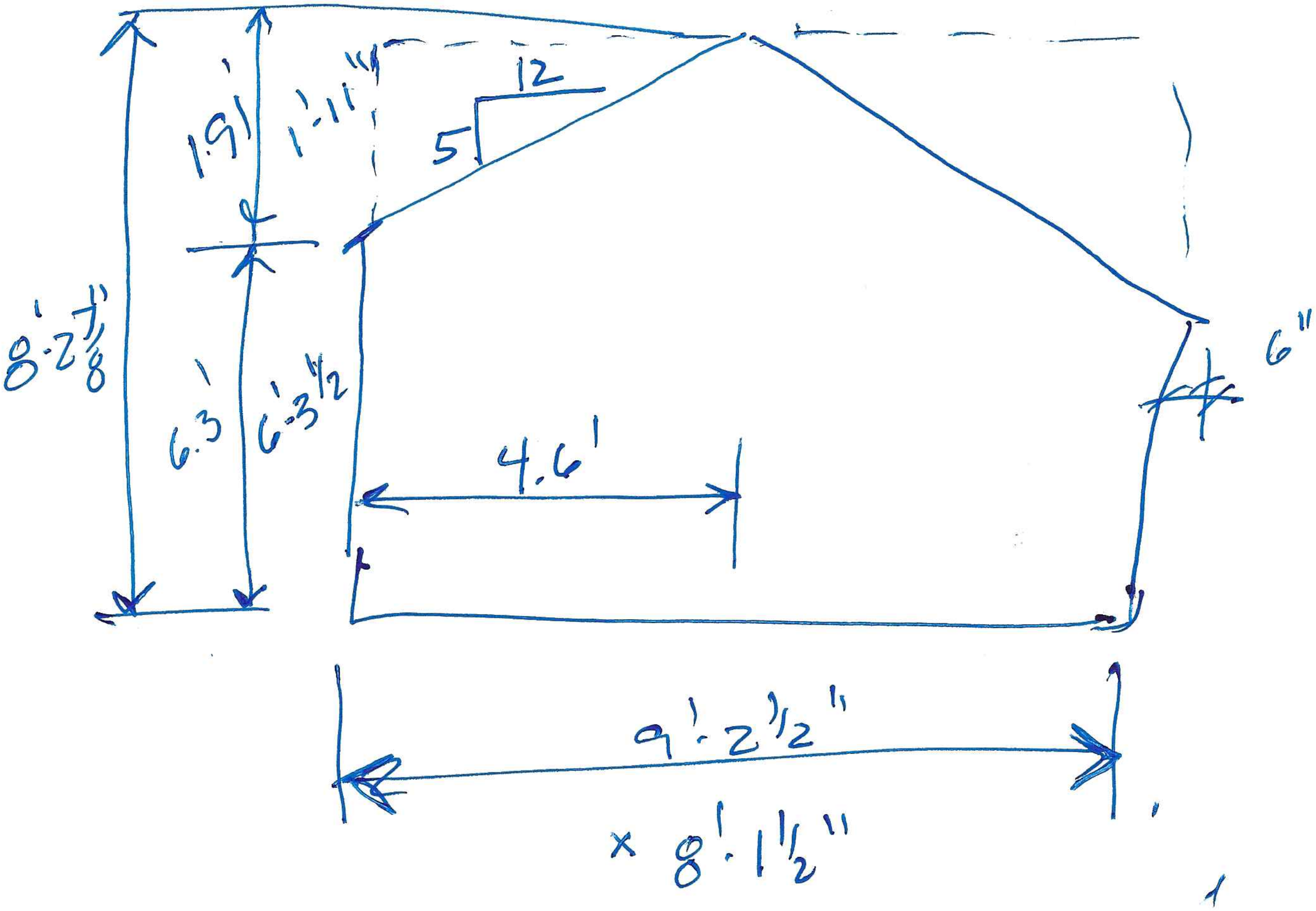
MEASUREMENTS

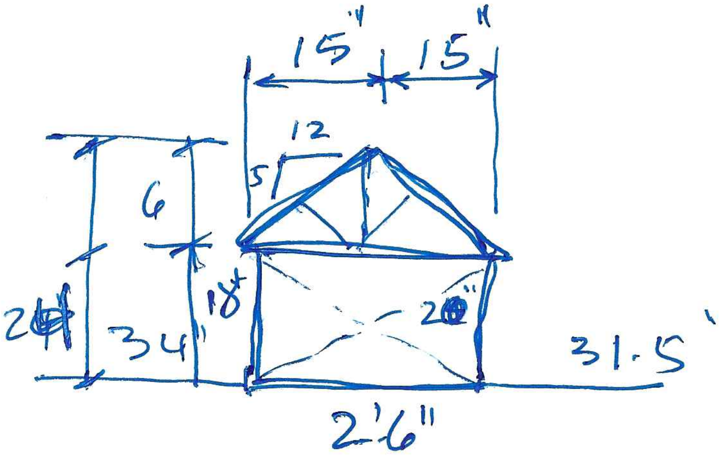




$\frac{4.6' \times 5}{12} = 1.9167'$

$= 23"$

$\approx 24"$



$1.25' \times 5 = \frac{6.25}{12}$

$= .52'$

$= 6"$

4 OCEAN. Ln